Marston Basin #4
Encapsulation and Sampling/Monitoring Plan

Marston Water Treatment Plant
6100 West Quincy Avenue
Denver, Colorado 80235

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Prepared for:
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Region 8
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1.0 Site History

The Marston Water Treatment Plant is located at 6100 West Qunicy Avenue in Denver, Colorado. Marston Basin #4 is a distribution tank/reservoir located on site and holds treated drinking water prior to entering the distribution system. Marston Basin #4 receives only treated drinking water from the water treatment plant. The treated water is distributed from the tank/reservoir to the distribution system which supplies potable water to Denver Water customers. No other uses or distributions occur from the tank/reservoir. This distribution tank/reservoir was constructed in 1960 and has a design storage capacity of 12 million gallons of water. The tank/reservoir is a buried concrete structure and was constructed with 12 vertical construction joints (expansion joints) within the walls of the tank/reservoir. These joints were sealed with a sealant/caulking material during construction. During a maintenance review of the tank/reservoir the sealants were determined to be deteriorating and in need of replacement. The engineer who recommended the removal pointed out that the sealants may contain a high concentration of PCBs and the material would need to be removed and disposed of properly. Denver Water sampled the sealants/caulking in the joints and the material did have a high concentration of Aroclor 1260 PCBs using EPA SW 846 Method 8080. The sealants were limited to the vertical construction joints which are approximately 1 inch wide by 1 inch deep and approximately 20 feet in height. A floor plan showing the locations of the vertical joints is included in Appendix A.

2.0 Sealant/Caulking Removal and Disposal

A contractor, Colorado Environmental Services, was hired in September of 2003 to remove all visible sealants/caulking from the joints and remove a small portion of the concrete in areas where the sealants were in contact. This removal project was scheduled during September and October of 2003 during a time the basin could be out of service. The removal process was done inside containment structures to prevent any release of PCBs outside of the removal area. Once all visible material was removed from the joints, wipe samples were obtained from the area to confirm removal. These results ranged from 4.8 µg/100 cm^2 to 6,900 µg/100 cm^2. The joints were then pressure washed by a second contractor, Custom Environmental Services, to remove any remaining material in the concrete. All sealant/caulking, containment material, rinse water and personal protective equipment (PPE) were containerized for proper disposal. The disposal method followed was 40 CFR 761.62 for Bulk PCB Product Waste and the material was incinerated by Clean Harbors Aragonite, LLC. in Aragonite, Utah, an EPA approved TSCA incinerator.

Destructive samples were then collected of the concrete at or near each joint and analyzed for PCBs using method 8080. The results indicated residual contamination in the concrete with a PCB concentration ranging from 2.9 mg/kg to 1000 mg/kg along the joints. The width and depth of contamination has not been completely characterized. It is anticipated that the PCB contamination extends below the surface and will require

extensive concrete removal. Removal and replacement of concrete on vertical joints is difficult and risks compromising the tank/reservoir's water tightness and future serviceability, if reinforcing steel is exposed and damaged. The 12 construction joints were encapsulated and resealed using an epoxy coating followed by the application of a polyurethane sealant. The tank/reservoir was washed, disinfected and filled with potable water. The water was allowed to remain undisturbed in the tank/reservoir for forty-eight hours. The water was then sampled at or near the joints and analyzed for PCB's using Method 508 for drinking water. All sample results were below the detection limit of 0.25 µg/L.

3.0 Encapsulation

To ensure encapsulation of the concrete continues to prevent the possibility of migration of PCBs, Denver Water will apply two or more coats of epoxy coating over each joint after the tank/reservoir has been drained. The coats will be of contrasting colors so that it will be obvious if the outer surface were to wear away. The coating will be Sikagard 62, a 2-component, 100 % solids, moisture-tolerant epoxy resin, a copy of the product data sheet and material safety data sheet are included in Appendix B. Once the two coats are applied and reach appropriate cure times, wipe samples will be collected using the standard wipe test procedure at 40 CFR §761.123 at the encapsulant surface of each of the 12 encapsulated joints. One sample location will be over the joint and at the location where the concentration of PCBs in the concrete is highest. Random locations will be selected for wipe sampling along the vertical dimensions of the other 11 joints. All sampling locations will be recorded. All sampling wipes will be prepared by the analytical laboratory prior to sampling and all samples will be analyzed for PCBs.

Quality assurance procedures will be followed. One blank wipe will be collected and labeled as sample number 13. Chain-of-custody forms will be used to track each sample from collection to laboratory and all wipe samples will be shipped in a cooler with ice and appropriate custody seals will be attached to the cooler lid. The samples will be analyzed for PCBs using EPA Method 8082 with a reporting limit of 0.2 µg/wipe (100 cm^2). If PCBs are detected at or above the reporting limit EPA will be notified in writing within five working days and the joints will be encapsulated again and resampled.

The hatch entry ways to the tank/reservoirs will be marked with the Large PCB Mark, $M_{L,}$ in accordance with 40 CFR §761.30(p).

4.0 Water Sampling

Denver Water is proposing to use the drinking water method 508A to analyze for PCBs in the water once encapsulation is complete. The tank/reservoir will again be filled with water and allowed to rest undisturbed for 48 hours. One sample will then be collected from the water column at or near the joint with the highest concentration of PCBs remaining in the concrete and one random sample will be collected from the water column at or near one of the remaining 11 joints. The samples will be submitted under chain of custody to the analytical laboratory. The location of the sample along the

vertical dimension of the joint and the distance from the encapsulant surface will be recorded. While method 508A is intended for screening Drinking Water and Drinking Water sources, it is capable of detecting Arochlors in aggregate form (all isomers are converted to decachlorbiphenyl- DCB) below the levels at which conventional methods can detect them individually. In the original (current) 1989 version of the method the developers cite MDLs in the range of 0.1-0.2 ppb (µg/L), depending upon the PCB mixture. Using modern analytical equipment, Evergreen Analytical Laboratories estimates MDLs about 1 order of magnitude lower, but has not performed a recent MDL study. This method will ensure that the PCB's are not detected at the current Drinking Water MCL of 0.5 µg/L.

5.0 Verification Protocols

The verification protocol at Sections 3.0 (before cleaning) and 4.0 will be repeated once every year. Denver Water will also collect a sample of the water annually from the effluent of the treatment plant prior to entering the distribution system and test for PCB's using method 508 to ensure compliance with the current drinking water regulations. The method 508 has a detection limit of 0.25 µg/L which is below the current 0.5 µg/L MCL.

If PCBs are detected at or above the reporting limits or if deterioration of the encapsulant is observed, EPA will be notified by telephone within 24 hours and in writing within five working days. The tank/reservoir will be immediately taken out of service, and repairs initiated.

6.0 Annual Tank/Reservoir Maintenance

The tank/reservoir will be taken out of service annually for maintenance and cleaning. The maintenance and cleaning consist of draining the tank/reservoir, washing the walls and floors of the tank/reservoir to remove any accumulated sediment from the tank/reservoir and then inspection to determine if any repairs are needed. Any sediment found will be sampled prior to cleaning and analyzed for PCB's using Method 8082 with a reporting limit of 0.2 mg/kg. Any repairs to the reservoir are completed at that time and may include: repairs to valves on inlet and outlet structures, wash water piping or repairs to access hatches on the roof of the reservoir. Once the cleaning and repairs are complete, the encapsulant will be inspected at each of the 12 joints. If any evidence of the base coat epoxy coating color is apparent, fading of the top coat, or any other signs of deterioration are observed, the encapsulant at the joint or joints will be repaired.

The repairs will consist of removing and replacing the epoxy coating or recoating the encapsulant with the same color as the original top coat of epoxy coating and allow the coating to cure properly. A wipe sample will then be collected at the repair location following the standard wipe test procedure outlined in 40 CFR Part 761.123 and analyzed by Method 8082 with a reporting limit of 0.2 µg/wipe (100 cm^2). If PCBs are detected at or above the reporting limit EPA will be notified in writing within five working days and the joint will be encapsulated again and resampled.

The location of each repair, the type of repair, and results of the wipe test will then be submitted to the EPA to document the repair and analytical results. An example of an inspection form is included in Appendix C. This form will be sent with the submittal to the EPA if repairs are needed.

7.0 End of Tank/Reservoir Life Removal and Disposal Plan

The Encapsulation and Monitoring plan are only interim procedures to ensure the PCBs do not impact the water during the life of the tank/reservoir. Once Denver Water has determined the tank/reservoir has served its useful life and the facility can no longer serve as a distribution tank, the remaining PCB-containing concrete will be remediated and disposed of in accordance with the PCB regulations. The contaminated concrete will be cut out and segregated from the non-contaminated concrete and containerized for transportation and disposal to a TSCA approved disposal facility. All appropriate state and federal laws and regulations will be followed at the time the remediation takes place.

8.0 Annual Report to EPA

A report will be submitted annually to the EPA on or before January 31 of each year that will summarize all activities relating to the encapsulated joints in the tank/reservoir. This will include the verification protocol results at Section 5.0, all PCB analytical results from water samples and sediment samples, all results from PCB wipe samples taken at joints where a repair has occurred and copies of the inspection log for that year.

Appendix A
Basin #4 Floor Plan

Appendix B
Sika 62 Epoxy Coating
Product Data Sheet & MSDS

Appendix C
Annual Expansion Joint Encapsulation Inspection Form

Appendix D
EPA Methods 508 and 508A